



tanalink



plotly

## Tanalink Closes the Yield Gap in Tropical Plantations with AI Models and IoT

Using Dash Enterprise, AI, and IoT-powered data pipelines, Tanalink brings real-time plantation visibility to optimize productivity and compensation.

# Executive Summary

- Tanalink created a real-time data system using IoT devices and Plotly Dash apps to track activity across remote oil palm plantations.
- Their solution connects LoRaWAN-enabled devices to apps with AI behind the scenes, providing visibility into operations like harvesting, fertilizing, and compliance.
- Using Dash Enterprise helped them scale quickly, manage user access securely, and deliver custom data export tools to clients across 25 to 30 plantation estates.

## Introduction

Tanalink builds hardware and software systems for large-scale tropical plantations, helping operators address the persistent yield gap in crops like palm. The company focuses on sustainable intensification, aiming to boost productivity across the 25-year lifecycle of each palm by improving operational decisions and labor management.

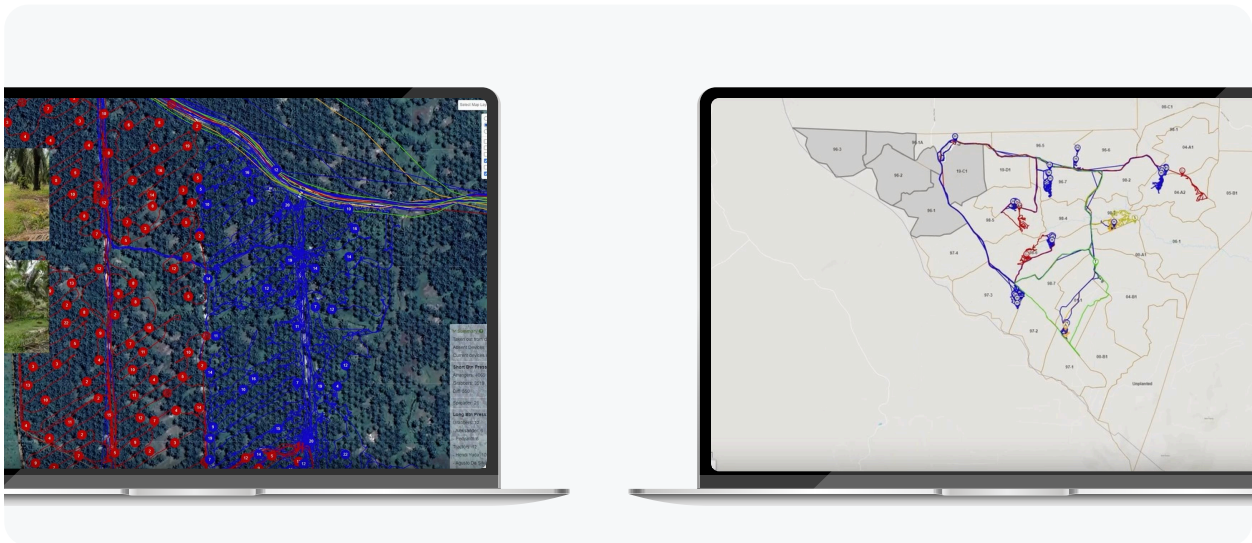
## Challenge

Despite steady investment in palm oil plantations, many operations struggle to reach expected yields. Much of the gap comes down to inconsistencies in field execution: fertilization may be skipped, harvesting may fall behind, or workers may not be where they are supposed to be.

Incumbent and manual tools like mechanical counters offer limited visibility into what's happening in the field, making it hard to tie outcomes back to actions. With operations spanning thousands of hectares and hundreds of workers, tracking performance and enforcing accountability is difficult, especially in areas with little or no internet access.

# Solution

To address these challenges, the Sopris team adopted Dash Enterprise to build a comprehensive automated reporting system. With Python, Dash, and Plotly's visualization capabilities, they created templates that streamline report generation. Each report includes multiple chapters integrated into a single PDF, with data pulled directly from BigQuery and processed through GCP components.



Raw data is piped through Airflow and Dataflow pipelines, feeding models that detect worker activity states and validate assignments. A density-based AI algorithm converts worker behavior into a multidimensional array for anomaly detection and predictive insights.

Sophisticated [Plotly Dash](#) apps visualize the data for plantation managers, offering tools for performance tracking, fertilization and harvest management, compliance, and data export.

The apps are secured using Keycloak integration, are scaled on GCP, and are accessible through a unified interface that allows users to toggle between apps. Ag Grid provides drill-downs for deeper insight, and future versions will support data input from users.

# Results

Tanalink's system delivers near real-time visibility into plantation operations, helping close yield gaps through smarter day-to-day decisions.

- IoT-powered Dash apps are now in use across 25 to 30 estates
- Apps support harvesting, fertilizing, and compliance tracking, with direct links to compensation
- Worker visibility is improved, with updates in 5-second intervals, enabling precise performance metrics and “proof of work” benefitting both the field workers and the field managers.

## Patrick Martinent

*CEO/CIO, Tanalink*

“With Plotly Dash Enterprise, we’ve built a solution that improved visibility across 2,000-hectare estates and increased productivity attribution accuracy by over 30 percent.”

This system provides plantation operators with the clarity they need to drive sustainable gains without expanding acreage. By combining physical sensors with fast, secure Python apps, Tanalink built a solution that scales across geographies and use cases.

## About Tanalink

[Tanalink](#) is an agritech company helping tropical plantations improve yield, efficiency, and transparency through real-time operational data. Its Tanaloxx device and cloud-based platform provide plantation managers with visibility into field activities, supporting better planning, accountability, and long-term sustainability.

## About Plotly

Plotly is a software company whose mission is to enable every company, around the world, to build data apps. Our product, [Dash Enterprise](#), is a platform of best-in-class development tools to quickly and easily visualize data in Python from virtually any data source. With customers across the Fortune 500, Plotly is a category-defining leader in enabling data-driven decisions from advanced analytics, machine learning, and artificial intelligence.